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ABSTRACT

A speech/language remediation-intervention model is proposed to enhance processing of auditory information in students with language or learning disabilities. Such children have difficulty attending to language signals (verbal and nonverbal responses ranging from facial expressions and gestures to those requiring the generation of complex utterances and/or written constructions). Alterations in the signal considered include pragmatic and suprasegmental aspects of the signal, the complexity of the syntax interacting with the complexity of semantics presented, familiarity, rate, redundancy, and context. Factors in the environment discussed involve competing linguistic messages, number of listeners, immediate vs. delayed response, and sociolinguistic considerations. Aspects of the response required center on levels of processing and types of tasks, types of questions, and memory. The strategies needed by learners are divided into primary and support strategies, with training suggestions provided. (CL)

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FACILITATING COMPREHENSION AND PROCESSING OF LANGUAGE
IN CLASSROOM AND CLINIC

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In preschools and schools, at home and on the playground, language is the vehicle by which old and new information is presented. Children must attend to that language, extract the meaning from it, assimilate it, and remember it. They must demonstrate learning and remembering of relevant information with verbal and nonverbal responses that range from facial expressions and gestures to those that require generating complex and novel utterances and/or written constructions. They must use the information in the language signal to make inferences, to predict consequences and to develop skills to use language to talk about language, i.e., metalanguage.

Children and adolescents with language disabilities and/or learning disabilities may experience particular difficulties understanding the language presented in the classroom, the language in school workbooks and texts, and the language used around them by their classmates. They often have problems in assimilating and remembering new information presented to them by their teachers and tutors. They have difficulty in using language to help their learning. We can document five possible problem sources: the language signal itself, its presentation, the environment, the response task, and the individual. There are factors in the language signal and the presentation of that signal and in the environment in which it is presented that affect the comprehending, processing, and remembering of the message. There are also aspects related to the response tasks that are required as well as the various strategies utilized by the listener or learner that affect these processes. The speech/language pathologist (SLP), the school audiologist, the teacher of the hearing impaired, and other education specialists can intervene to make alterations and adjustments to the signal and its presentation, the environment, and the response tasks that can enhance comprehension and processing. They can help the listener develop strategies to facilitate learning.

This paper discusses each of these factors using data from selected research areas, such as, cognition, auditory processing, language processing, sociolinguistics, attention, levels of processing and memory, metamemorial processes, and learning strategies. A remediation-intervention model is proposed to enhance processing of auditory information. Alterations in the signal consider pragmatic and suprasegmental aspects of the signal, the complexity of the syntax interacting with the complexity of semantics presented, familiarity, rate, redundancy and context. Factors in the environment discuss competing linguistic messages, number of listeners, immediate vs. delayed response, and sociolinguistic considerations. Aspects of the response required examines levels of processing and types of tasks, types of questions and memory. Lastly, the strategies that a listener needs to develop are reviewed. These strategies are divided into primary strategies and control strategies. Techniques by which strategies can be trained and developed by the learner to facilitate processing and remembering are considered.

FACTORS IN THE LANGUAGE SIGNAL can be considered in terms of phonology, pragmatics, syntax, semantics. Although breaking the signal down this way for discussion is convenient, the interaction and interdependency of each of these elements is critical for comprehension of the signal. Phonology refers to the sounds of language and includes both segmental features, those that describe each consonant and vowel, and suprasegmental features, all other features, such as, intonation patterns, rate, pitch, loudness. Suprasegmental cues help indicate phrase and sentence boundaries, content words, given or presupposed information (that information assumed to be already known by both speaker and listener). An announcement, "JOHN broke my airplane," with stress on John, assumes that the listener sees the broken airplane but needs the new information that it was John that broke it. The suprasegmental feature of stress indicates the new information or focus to the listener. Repeating a

sentence, such as the following, emphasizing a different word on each repetition demonstrates the difference in interpretation.

Kim took the exam.

Different stress patterns alter the meaning and what is supposedly the new information a listener must interpret.

Pragmatics refers to rules regarding use of language in context. The suprasegmental patterns provide, in part, this contextual or pragmatic information, such as the speaker's meaning or intentions regarding the message. We know if the speaker is joking or being sarcastic from the intonation pattern. We interpret if a speaker is frightened or angry by suprasegmental patterns. Pragmatics covers the social rules of using language in any situation--who talks or listens, to whom, how does one talk, how should what is said be interpreted. Assume a student interrupts your work to ask to leave a message for a new colleague. You state, with obvious impatience and annoyance, "Oh, all right!" The wise student's response is a hasty retreat and mumbled, "Sorry." Interpretation was not based on the words used but the way the words were stated. "Are you hungry?" stated at 7:00 P.M. outside of a nice restaurant can certainly be inferred, under most circumstances, as an invitation. Difficulty in interpreting pragmatics may be a factor in the comprehension and social problems the language/learning disordered children often demonstrate. Many of these children do not use the context and intonation to interpret a speaker's intentions or meaning. They miss the humor which is frequently based on the incongruous situation and sarcasm signaled by a specific intonation pattern. In processing sentences, difficulties may occur when the listener misinterprets the speaker's intentions or when the presuppositions between speaker and listener do not match. Teachers, clinicians, and parents are often aware of the difficulties the children with language and learning difficulties have in using the context

of the situation and suprasegmental cues to interpret the message in the signal, understand the humor in a joke, or pick out sarcasm. These children frequently seem to make a literal and serious interpretation of even the most obvious jokes. This failure to interpret these cues is often socially devastating for the child and should receive consideration in the intervention program.

Through small group activities or peer tutoring, children with problems in interpreting pragmatics can obtain practice in identifying different intonation patterns, in comprehending the joke, in role playing and interpreting alternate meanings and intentions of a speaker. Several workbooks provide exercises for the student in interpreting social interactions and peer relationships (Farnette, Forte, and Harris, 1979; Farnette, Forte, and Loss, 1977). Work on this does enhance the child's abilities to comprehend this aspect of the language signal.

Syntax refers to the form, structure, word order of a sentence. Syntax increases in complexity through addition of, deletion of, and change in order of morphemes, words, modifiers, phrases, embedded sentences, or conjoined sentences. The transformational generative grammar model defines syntactic complexity as the number of transformations involved in producing an utterance or construction (Jacobs and Rosenbaum, 1968).

All transformations do not add, or add equally, syntactic complexity to negatively affect general language comprehension. However, studies with children and adults show that increasing syntactic complexity affects speed and accuracy of comprehension (Gough, 1965; Miller, 1962; Savia and Perchonock, 1965; Slobin, 1966; Jarvella and Lubinsky, 1975). As syntactic complexity is increased, processing time increases and accuracy of comprehension decreases (Lasky and Chapandy, 1976).

Some constructions seem to be more detrimental to comprehension. Among these are logical conjunctions, such as, and, or, nor, until, except, although, if-then. These conjunctions not only add syntactic complexity via conjoining

two or more sentences, they modify the meaning of each sentence conjoined. Constructions using deletions, such as, ellipses and anaphora present problems for some children. (An example of anaphora: John went to the zoo and Mary wants to do the same. Do the same refers to "go to the zoo.") We need to be aware and check comprehension of these constructions prior to using them for information exchange.

Semantics refers to the information one has regarding word meanings. As a child acquires meaning of a word, s/he may acquire a partial, rather than a full meaning (Clark, 1973). The child, however, does not know s/he may not have the full meaning and may misinterpret or miscomprehend the word. One child in our clinic told us she knew that a "scale" was "where mommy measures her feet every day." What a child knows about a word or event affects how s/he comprehends a message about it (Stolz and Tiffany, 1972) just as what the reader knows about discourse, macrostructure or microprocessor affects interpretation of the sentence, "Analysis of the elements of macrostructure can be facilitated with our program and a microprocessor." What children know about the word scale or the words, quotient, precipitation, set, or short vowel, affect how or if they process sentences containing these concepts. Many children with language/learning difficulties have serious problems with comprehending and remembering semantic concepts or vocabulary. In order to facilitate their comprehension of the concepts that they need, we need to work directly on presenting critical semantic concepts and providing examples and opportunities to use and practice them.

What semantic concepts should be presented? How do we select the concepts the child needs to know? Concepts a child must understand to comprehend language used in kindergarten and grades one and two are evaluated by the Boehm Test of Basic Concepts (BTBC) (Boehm, 1971). (This test is a group

test to be administered to classes or it can be adapted to use with individuals or small groups.) Those concepts in the curriculum materials that are presented at nursery levels or in the elementary and secondary levels are selected by individual school systems, however, and, consequently are not uniform. There is no standard set of required concepts for preschool programs or post primary grades. Speech/language clinicians, audiologists, and other specialists can examine books, curriculum outlines, and teacher editions of texts. Primary and elementary level books list new words or concepts in the appendix. Secondary level texts list new and review vocabulary for each chapter or unit. Comprehension of these concepts can be checked and work on problem areas instituted. A child that has had ongoing difficulties may need to be checked on concepts from earlier grade levels as well as from current class materials.

Semantic/syntactic interaction: both syntactic complexity and semantic knowledge influence comprehension. Their complex interaction in the auditory signal (in a classroom or clinic) has a critical affect on learning. Consider your processing of the following sentences:

"Multiple regression/correlation analysis solves the problem of relating k X variables to a single Y by finding a set of regression coefficients or weights with which to fashion of the X variables a linear composite that is maximally correlated with Y, as expressed in the regression equation." (Cohen and Cohen, p. 428).

The semantic load for you or some readers may have resulted in skimming the sentence without attempting to obtain all essential information. If this or any presentation used complex esoteric semantic concepts in complex syntactic constructions, listeners stop attending after a few words. With use of familiar concepts, concepts matched to listener's comprehension or interests, or with simplified syntax, listeners usually attend. Listeners can then

process enough to identify what they may not comprehend and ask for a repetition in order to try again, to hear and comprehend the message.

In a classroom, information presented to children is as syntactically and semantically complex at the children's level of education as the previous example sentences were for some readers. The syntactic/semantic load for the child with a language or learning disorder may be sufficiently demanding that the child tunes out, does not listen, or cannot attend. To help this child, alter the information--the signal. Performance on listening tasks can be facilitated as suggested by Lasky and Chapandy (1976):

1. Simplify the syntax in giving instructions or when presenting any new, unfamiliar material. Present new concepts in short simple, active, affirmative declarative sentences.
2. Specifically teach the semantic concepts before they are incorporated in the usual lessons. Enabling children to obtain some familiarity with the concept enables them to process the concepts faster and with greater accuracy.
3. Start simply but build to include concepts in syntactic constructions as complex as those presented to a child in the classroom.

ALTERING THE PRESENTATION OF THE SIGNAL TO FACILITATE COMPREHENSION:

Contextual cues influence perception and facilitate comprehension. They trigger a listener's expectations, help focus attention on salient points, affect interpretations of words, sentences, and prose passages. Contextual cues include statements of the theme, instructions to listeners, an outline of the lecture, pictures in the text, topic headlines, and directed questions. Contextual cues can be added as examples, key words, statement of the main ideas, pictures, tables, graphs, or diagrams. Tell the listener what you will talk about, talk about it, summarize what was talked about. These cues help any listener to anticipate information, see relationships, organize and remember information.

Familiarize the unfamiliar by using examples that relate the new information to what is already known. Examples should be dramatic (Gagné and White, 1978) and/or be related to the background, interests, and experience of the listeners. Personal examples can be intriguing. Using names of children in the class rather than hypothetical names for characters can increase the likelihood that children will comprehend and remember sentences (Olsen, 1974).

Rate of presentation affects performance of normal and learning disabled subjects. Comprehension of speech by learning disabled children, aphasic children, and aphasic adults is increased when a slower than normal rate of speech delivery is used (Lasky, Weidner, and Johnson, 1976; Myklebust, 1954; McGinnis, 1963; Peck, 1977; Thompson and McCrosky, 1973; Weidner and Lasky, 1976). Presentation can be altered by slowing the presentation of each word in the message; a more effective way of altering rate is through inserting pauses at critical points. Although the size of the critical unit varies depending on the listener's task, the phrase may function as the unit of perception in many listening situations (Neisser, 1967). Insert a pause between the noun phrase and verb phrase of a sentence, between the verb and the following noun phrase, before and after an embedded sentence. Additional time is then available for processing the phrase. Improvement in comprehension has been observed among normal and learning disabled first grade level children and as well as with language-disordered children in the clinic when new material was slowed by the addition of 0.75 to 1.00-second interphrase pause times. In presentations to college students interspersing pauses between major constituents facilitates comprehension of complicated material.

Redundancy through exact repetition of a novel point enables the listener to hear it again. If the concept is new, critical and/or complex, listeners find the redundancy helpful. Haynes and McCallion (1981) showed that performance

on the Test of Auditory Comprehension of Language (Carrow, 1973) was significantly better when the stimulus phrase was presented twice than when presented once as in the standard version.

Intensity and location research is limited regarding effects of intensity and location of the signal source for the child who has normal peripheral hearing but may have difficulty in processing language in the classroom. Reaction time has been shown to decrease with increase in signal intensity (up to a point) (Massaro, 1975). Clinical evidence, however, suggests that, for some of the children, increasing the intensity, via the talker talking louder or via amplification, improves comprehension. Close proximity to the signal source also helps some children. These adjustments may help focus the child's attention on the signal or may enhance the signal to background noise ratio.

This section has presented some factors that can facilitate processing by altering the language signal and its presentation. Factors considered included: teaching and providing practice in interpreting suprasegmental and other pragmatic signals, attending to the syntactic complexity, the semantic complexity and their interaction by practicing simplifying syntactic complexity when presenting new and/or difficult semantic concepts. Once the semantic concept becomes familiar, syntactic complexity can be increased. The manner of presentation can be altered by using contextual cues, familiarizing the unfamiliar with examples, slowing the rate, increasing the redundancy and attending to intensity and location of the signal source.

ALTER THE ENVIRONMENT to help comprehension and processing. As specialists, we may evaluate and provide remediation for a child individually or in a small group. Performance in this environment is not necessarily identical to performance in a classroom setting. Differences between these two settings that can affect processing the language signal include: competing auditory stimuli,

immediate versus delayed response paradigm, number of listeners and speaker listener interaction, sociolinguistic rules and variables.

Competing auditory stimuli includes ambient or background auditory stimuli that can interfere with processing the signal information presented. Among the auditory stimuli in the classroom are linguistic and non-linguistic stimuli, stimuli presented by the teacher, stimuli produced by children in the class, stimuli which are relevant and that which are non-relevant to the learning task. Through perceptual focusing and directing attention, the child tunes in selected stimuli and resists competing stimuli. In a learning task, attention must be maintained on relevant stimuli and competing stimuli disregarded. Which stimuli are selected depend on external environmental factors and internal organismic factors (Lasky and Tobin, 1973). The interference of the competing stimuli is a result of the number of competing messages (Miller, 1947; Hogan and Hanley, 1963), the content of the competing messages (Carhart, Tillman and Greetis, 1969; Speaks, Carmen, and Benitez, 1967), and the difficulty of the performance task (Webster and Solomon, 1955; Treisman, 1964). Lasky and Tobin (1973) found performance of children with suspected learning disabilities was negatively affected by linguistic competing messages; linguistic competing messages were disruptive whereas a non-linguistic competition (white noise) was not. Children with learning problems generally do more poorly than normals under linguistic competing messages. Children with reading problems have difficulty in recalling stimuli in a competing message condition (Satz, Rardin, and Ross, 1971). We see this in ourselves, people chatting near us may not bother us if we are listening to a story that is easy, interesting and absorbing. That chatting may disturb and disrupt us if we are attempting to listen to a difficult lecture, prepare a research report or learn complicated material. We need to note the child's performance when there are one to three competing talkers. If there are more

than four speakers, the competition is a noisy unintelligible mass, more like a white noise, and is easier to disregard (Miller, 1947). A carrel may limit visual distractors, but does not limit auditory distraction. As a teacher works with one child in a carrel, the others cannot help but be aware of the voices. Some children find earphones useful in blocking out competing messages. Some children can be desensitized to disrupting message competition. They can be trained to attend to the signal while actual or simulated competing messages are added at very low levels at first (e.g. +20 dB S/N). The competing message level can be gradually increased.

An immediate versus delayed response paradigm is possible in an individual session. The examiner can ask a question or present a stimulus and the child can respond immediately or as s/he chooses. In a classroom setting, however, the child needs to attend and process the auditory signal, raise his/her hand, and wait to be called on. Often the duration of this interchange is greater than a few seconds, and memory is involved. Performance, then, can be different in different settings. What is processed and remembered is influenced by the strategies used to help in the remembering and retrieving of the desired response. There is certainly ample evidence that recall performance is poorer under conditions which require even short delayed responses (Bauer, 1977). Again we must differentiate among familiar or new, simple or complex material. With the easier and more familiar, begin to require a delay. Gradually increase the delay time up to a few or more seconds. As the child acquired strategies to facilitate remembering, introduce a response delay format even when unfamiliar or complex material is presented.

The number of listeners affects the comprehension. When required to respond in a class or group setting, fear or related feelings may interfere with our usual pitch levels, rate of speech, fluency in speaking, heart rate, and ability to respond adequately. Our performance and our feelings about our

performance may have been negatively affected; we didn't even listen or hear part of the lesson. Some children with language/learning problems relate similar experiences. Many have poor self-images; some expect to do poorly in a group setting. In developing intervention procedures we need to address this difference between group and individual settings. Talk about it with the child. Find one activity the child may be secure in and build from that. Practice and over learn responses to questions supplied by the classroom teacher. The child can also be helped to recognize the effects of social pressures. This usually lessens the confusion, bewilderment, and fear. As the child becomes more familiar with information presented in class, s/he may find the environment less frightening.

Speaker listener interaction induces subtle changes in the delivery of the signal. In a dyad, rate, stress patterns, redundancy, and other variables are a function of listener reaction. Even presentation of standardized instructions vary slightly depending upon listener reactions and responses. Task instructions, and linguistic information presentation manner, and performance feedback are all influenced by group size, room size, proximity and arrangement of the speaker-listener. In turn, the child's performance alters.

FACTORS WITHIN THE RESPONSE TASK THAT AFFECT PROCESSING AND COMPREHENSION

Two issues seem particularly cogent in considering the response task as an aid to comprehension: active versus passive learning and levels of processing. These are briefly discussed and then related to the tasks the listener is expected to perform in the classroom or clinic.

Active Versus passive behavior is seen to be the key factor in our descriptions of human learnings and interactions with the environment. At almost any age, the greater the degree of involvement, the greater the learning (Brown, 1979; Nuttin, 1976). Summarizing intensive work with infants under six months of age, Siqueland (1969) rejects any indication that the infant is a passive receiver of

information; rather the infant appears to seek out stimuli and activity. Reviewing classic studies of active versus passive learning, Walk (1978) emphasizes that activity is critically important for learning at any age. Soviet research reviewed by Brown (1979) demonstrates the need in young children as well as older children for goal directed, active and meaningful behaviors for learning. Activity is directed by the child's intentions, motives, and interests (Weiner, 1976) and any tasks which are tied to real-life interests produce greater effort and greater comprehension (Nuttin, 1976). Intent to learn produces greater learning (Nuttin, 1976).

In the levels of processing model, the type of activity done by the learner determines how well s/he comprehends and remembers the information. A stimulus may be processed at a shallow level in which factors related to the sound or appearance of the stimulus are extracted. This information is transient and easily lost. If a stimulus is processed more deeply, if the task requires interpreting the meaning of the stimulus, then it will be processed at a deeper level, comprehended at a deeper level, and retained in memory for a longer period (Fraik and Tulving, 1975; Jacoby and Fraik, 1979; Kintsch, 1979). The progression is from shallow levels, such as indicating if a word or phrase is in capital letters or contains a particular phoneme, to the number of syllables in the word, to imitating or repeating a word or sentence. Successively deeper levels are required to determine the syntactic category of the word or to categorize meaning. Requiring a paraphrase of a sentence requires still deeper processing, judgements of the fit of the sentence in context are more involved, and supplying sentences that could logically follow the stimulus requires even deeper processing.

Structuring learning tasks so children must process the semantic, syntactic, and pragmatic aspects of language more deeply should, therefore, enhance comprehension, learning and remembering. This suggests that requiring paraphrasing

rather than immediate or delayed imitation can facilitate children's learning and remembering of a concept or construction. If children must explain a usage or a rule, deeper processing is necessary and that should facilitate remembering. To promote active listening and recall, plan procedures so the child in the clinic listens and must verbally fill in the last word of a _____. Tasks may be adapted from work by Anderson, Goldberg, and Hidde (1971) and Kane and Anderson (1977) in which subjects either read aloud entire sentences or read aloud sentences for which they had to supply the last word. If the word to be supplied was clearly determined by the semantic content of the sentence, such as, "Elevators stop at every _____." or, "The executive sat behind a large _____." subjects remembered significantly more than subjects who merely read the entire sentence aloud (Anderson, Goldberg and Hidde, 1971). When the required word was not clearly specified by the semantic content, such as, "Neil went to shop for a _____." subjects supplied their own word but were then shown the correct (experimenter's) word (Kane and Anderson, 1977). Incidence of remembering the experimenter's word was greater regardless of the match between it and the subject's word when tested without delay. With a week's delay, the subject's word interfered with remembering of experimenter's word, although performance was still better than for those who read complete sentences. Kane and Anderson suggest that students' learning can be enhanced by either structuring questions so as to require processing in depth while errors are minimized or by providing further practice with questions and the corrected response. The technique requires active listening and attending.

Evaluation and remediation activities often use simple tasks such as picture pointing, imitation, or repetition following a model. These tasks require little if any processing, and they demonstrate comprehension or production of language at the lowest levels. Students need make no decisions nor generate novel

constructions, nor use language purposely, i.e., communicatively. Response tasks can vary from detection of a stimulus, as in audiometric testing, to discriminating between presented stimuli, as in true-false or same-different, to recognition tasks, i.e., selecting one target item from three or four or five foils (multiple choice tasks). In the recognition task, all possible answers are presented and the subject must recognize the correct one. Higher level tasks require recall in which no alternatives are presented, such as in a fill-in, to making inferences, to problem solving and explaining relationships. Tasks for a child can require low level responses at first. As more familiarity with the content is attained, tasks become progressively more difficult. As the child gains greater comprehension of semantic concepts or syntactic constructions, a response task can require deeper levels of processing to be more meaningful, more readily comprehended and remembered, more resistant to forgetting. Role playing, providing personal examples, explaining, paraphrasing, making inferences, and giving verbal illustrations are examples of student activities that require deeper levels of processing. The SLP and audiologist should be aware of the level of difficulty of the demands made in the classroom. Check out examples of seat work used, teacher generated questions, and workbook lessons assigned. Match levels of task difficulty in the clinic to that used in the classroom.

FACTORS/STRATEGIES WITHIN THE INDIVIDUAL. In the last 10 years educational research has shifted from almost exclusive emphasis on improving teaching methods, to research focusing on describing development, use and improvement in children's strategies (Dansereau, 1978). What types of strategies do children use? Do all children acquire strategies? Do they do so spontaneously? Can children be helped to develop strategies?

Children need to learn to attend to and remember what the teacher says. Children need to learn what to listen to and how to listen (Cook-Gumperz, 1975),

how to ask questions, recognize what is being asked, and how to answer (Norman and Bobrow, 1976). They need to develop techniques to organize information, store information in memory and to retrieve it (Brown, 1977). They must learn to evaluate the demands of a task and their ability to meet these demands (Flavell and Wellman, 1977).

As they need to use these skills, most children develop them spontaneously beginning at least by the second to third grade. They refine them over the years to ages 11 or 12 (Brown, 1975; Brown, 1979; Naus and Halasz, 1979). Some children, however, do not appear to develop these organizing, learning, and remembering strategies. Some do not seem to comprehend the tasks of listening and picking out relevant information, asking questions, and evaluating what should be done (Brown, 1979; Brown and Campione, 1978; Flavell and Wellman, 1977; Naus and Halasz, 1979). Many children with language/learning disabilities do not seem to develop and use these learning and organizing strategies and, as a consequence, proceed in an unplanned and unorganized manner (Schworm and Abelseth, 1981). They have greater than normal difficulties in using language and strategies for comprehending reading material, for verbal reasoning, for determining cause and effect, selecting key ideas, and making inferences (Kavale, 1980). Although often deficient in use of mnemonic strategies, mildly mentally retarded children are able to learn strategies to improve remembering. The training can be maintained over time and generalized to use in subsequent and other types of tasks (Campione, et al., 1980). Children with low language skills can significantly improve performance in selected activities with training in verbal mediation and verbal self direction (Weithorn and Kagan, 1979).

Clinicians, audiologists, special educators must be aware of what strategies children (and adults) can use to enhance learning--to learn how to learn, to help themselves understand and remember. We need to determine which strategies

may be relevant and helpful for specific children. We need to help gain the power to select and apply/organizing, learning, and memory techniques!

This next section briefly describes selected primary strategies that may be demonstrated and taught to a listener/learner and then discusses control techniques to use in cognitive monitoring, selecting and using strategies for learning. This area of strategic learning is currently receiving a great deal of attention and there are numerous reports, articles, chapters and books discussing aspects of this topic in detail. The results of training specific strategies are usually evaluated in terms of 1) improvement in performance due to training, 2) durability or maintenance of the strategy following training, and 3) generalization of the strategy to other situations or learnings.

The primary strategies included here are verbal mediation, rehearsal, imagery, analysis of key ideas, systematic retrieval, and following directions. Use of any strategy should not be assumed. Give the child opportunity for learning, evaluate use of any strategy, train a strategy, if needed, and provide opportunities for practice. Children need to comprehend and recognize the value of a strategy for them to use it and maintain using it (Brown, 1978).

Verbal mediation refers to using speech to regulate or mediate behavior (Luria, 1961). Both overt--speaking aloud to oneself--and covert--inner speech--can influence perception, understanding, and problem solving (Blank, 1974; Kendler, 1963). Training in verbal mediation and verbal self-direction with first grade impulsive children with low language skills was shown to significantly improve performance (Weithorn and Kagen, 1979). We use verbal mediation whenever we tell ourselves messages, such as, "Slow down," as we spot a police car on the highway. We talk ourselves through a complex project. To train verbal mediation, select a project and teach the child to describe out loud what he should be doing step-by-step. Observing the child using verbal mediation should enable us to

determine if the technique is understood. With success in overt verbalizing, covert verbal mediation can be taught.

Rehearsal involves repeating a telephone number or series of to be remembered items. Most of us use rehearsal, at times, to remember topics, items, or events. As with any strategy we should not assume any child uses rehearsal or any other strategy. It may be necessary to teach active (aloud) rehearsal, and later, silent rehearsal. Paraphrasing, unlike verbatim imitations, requires deeper levels of processing. The message is transformed into the child's language to be integrated with information the child knows. Paraphrasing can demonstrate to the child what s/he comprehends and what s/he should review.

Imagery involves drawing or describing a mental picture of the ideas or information presented. Filling in details via imagery can help in focusing and monitoring attention and remembering. Imaging common scenes or imaging bizarre situations may differ in effectiveness for any particular child.

Networking, the student identifies an important concept and relates it to familiar concepts--builds networks, bridges from stored ideas to new concepts. Networking can help place a concept in a context, e.g., relating it to a part of a general topic or outline. Student's comprehension can be helped by teacher prepared networks presented both before and after material is presented (Dansereau, 1978).

Analysis of key ideas is an alternative to networking in which a student identifies key ideas or concepts, defines them, elaborates and interrelates them (Dansereau, 1978).

A systematic retrieval strategy helps retrieve items from memory as the student learns to pick out the main theme of a question being asked and think through related ideas in a sequential orderly manner (Dansereau, 1978; Lindsey and Norman, 1972). Related ideas can be shown to be useful to cue or trigger a

temporarily inaccessible item. A substrategy is to instruct the student to relax and imagine the situation in which they acquired the sought after information.

Following directions is such a common place task that we may not recognize that some children do not know they are supposed to listen and follow the directions given. As clinicians, we often assume a child may have needed help remembering directions, not in learning how to follow them. We now recognize that for some, there is a need to teach this strategy. Excellent materials are available for kindergarten to secondary levels. A direction is presented, such as "Put a line under the girl who is jumping." This is followed by questions breaking down the task, e.g., "You are to find the girl who is ____ (A) jumping, (B) running, (C) talking." "You are to make a line ____ (A) on her, (B) under her, (C) after her." The last set contains a marked picture and the child is to indicate if it were done correctly (Boning, 1979). Obviously the materials vary depending upon the level selected. Reading materials can be adapted and used in listening tasks to improve listening performance.

Similar materials are available and can be adapted to teach the child strategies of listening and learning how to: get the main idea, use the context, locate an answer, draw conclusions. Materials for improving memory skills have been developed and can be adapted as needed (see for example: Campione, Nitsch, Bray, Brown, 1980; Kestner and Borkowski, 1979). Several encourage training over a series of days, training with some changes in the pattern of work, changes in the place of work, asking oneself why questions, using examples and using feedback as improved task performance.

Critical techniques or support strategies can be used to monitor our thinking, learning, attitude, concentration and progress. The primary strategies have greater impact on learning if the student is able to use these critical control

or support strategies.

Cognitive monitoring influences comprehension of auditory information, language acquisition, memory, attention, reading comprehension, and other related skills (Flavell, 1979). Metacognition, our knowledge about cognition, and cognitive monitoring refers to what and how we think about our knowledge about people and tasks, e.g., your belief that you aren't as good in math as Eric or Pam, or that you learn better by listening than reading. We have metacognitive experiences that accompany cognitive activity, e.g., your feeling that you didn't understand something or that you have learned something well. By thinking about the demands of a task we select a strategy to use. Metacognitive behaviors influence our judgments of the difficulty of a task, if and how we try to learn something, whether we think we know something well. Children and adolescents can be taught to use cognitive monitoring to select and attend to the appropriate auditory signal, to check on their comprehension and remembering of information. They can check on their progress and determine if their behavior is appropriate or should be altered. We have all had the experience of listening to a lecture and suddenly realizing we are unaware of what was said; we weren't really attending or processing. Self-monitoring is a useful strategy for us; it is vital for a child who typically has difficulty selecting the proper signal and maintaining attention. Children can learn to identify areas of difficulty, learn how to ask for help and when and where to seek more information. Teaching monitoring strategies to a child can:

1. Help the child be aware of what s/he knows and doesn't know.

S/he learns to evaluate what s/he knows and what s/he doesn't know, what s/he remembers and what s/he doesn't, when s/he is listening and when s/he is not. What is the reaction this child gets when the teacher completes giving directions for a task and s/he asks, "What are we supposed to do?" The reaction will be different if s/he states, "I remember we are supposed to read something and answer. . .

but can't remember the rest."

2. Help the child learn how to listen and to anticipate.

Some children, if they have difficulty, retreat from listening, learn not to listen (Bryen, 1981). Some children need practice in identifying and anticipating narrative structure. Most children know what to anticipate from stories, TV shows, commercials: a setting, theme, plot with episodes, resolution. Their anticipation of this structure and practice with it facilitates their processing of incoming information (Brown, 1975).

3. Help the child ask relevant questions.

Learning to ask appropriate and relevant questions is critical (Bransford and Nitsch, 1978). The child can begin to assume responsibility for recognizing what s/he doesn't know and needs to know. Present a question and part of a story. Ask the child to paraphrase what s/he has heard, identify what he needs to find out, and how to frame an appropriate question. Provide practice by the specialist, the classroom teacher, or with guidance, family members or peers.

4. Help the child know how to answer questions.

To answer a question we need to know what is being asked. Exercises are available to teach this strategy, such as the level three exercise (Boning, 1979) that presents, "Where are they going to stop?" The child selects what is being asked from the set of, (A) place, (B) way, (c) time." Another example from level six: "About how many stars are there in our galaxy?" Select answer from "(A) type, (B) way, (C) person, (D) number, (E) place." Exercises are available for various grade levels and can be adapted to a variety of presentations to provide practice in listening and comprehending what question is asked and what is necessary to know to answer it.

Positive learning attitude. Young children who are experiencing difficulty in comprehending and processing information and learning often have negative

emotions about learning. Techniques used to deal with these attitudes combine desensitization and relaxation (Dansereau, 1978; Jacobsen, 1938), rational emotive therapy (Ellis, 1977) and therapies based on self-talk (Meichenbaum and Goodman, 1971; Meichenbaum and Turks, 1975). Students are taught to become aware of feelings and the self-talk they use. Children and adolescents can evaluate and modify their images and self-talk, to image anxiety producing situations during relaxation, to image successful studying, to image distractions and overcoming them during relaxation (Dansereau, 1978; Schultz, 1981; Wells, 1981).

Concentration or coping with internal and external distractions: Many children are continually distracted by internal and external stimuli. Even the young children can be helped to determine when, how, why, and for how long s/he is distracted, and her/his reactions to the distraction. Again, awareness, relaxation, positive self-talk, and imagery can facilitate improved learning states.

CONCLUSION: Efforts in working to enhance children's comprehension and processing has led to provocative and challenging areas. The suggestions presented in this paper have been skimmed from research reports representing varied disciplines. Care has been taken to extract procedures that have been demonstrated through basic and applied research. The approach discussed here suggests comprehension and processing can be facilitated by attending to and modifying the signal (information), its presentation, the environment in which it is presented, the response required, and the strategies the listener uses.

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Title: Facilitating Comprehension and Processing of Language

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In preschools and schools, at home and on the playground, language is the vehicle by which old and new information is presented. Children must attend to that language, extract the meaning from it, assimilate it, and remember it. Children and adolescents with language and/or learning disabilities may experience particular difficulties comprehending the information presented in the classroom, the language in school workbooks and texts, and the language around them by their classmates.

- A. Factors in the signal which may affect comprehension and processing and may be adjusted to enhance processing.
 - 1. Pragmatic/suprasegmental aspects of phonology.
 - 2. Syntactical complexity.
 - 3. Semantic complexity.
 - 4. Interaction between syntactic and semantic complexity considering familiarity and meaningfulness.
- B. Factors in the presentation.
 - 1. Contextual cues.
 - 2. Familiarize the unfamiliar.
 - 3. Rate and pause time.
 - 4. Redundancy.
 - 5. Intensity
 - 6. Location
- C. Factors within the environment.
 - 1. Competing linguistic messages under conditions in which the signal is difficult.
 - 2. Immediate versus delayed response.
 - 3. Number of listeners and fears.
 - 4. Speaker-listener interaction.
- D. Factors in the response required.
 - 1. Active versus passive learning.
 - 2. Levels of processing.
 - 3. Build levels of task difficulty from discrimination responses to recognition to recall to inference to generalization.
 - 4. Types of questions asked: convergent thinking, divergent thinking, making inferences.
- E. Training the listener/learner in use of primary strategies.
 - 1. Verbal mediation
 - 2. Rehearsal
 - 3. Imagery
 - 4. Key ideas
 - 5. Paraphrasing
 - 6. Following directions
 - 7. Other strategies such as: getting main idea, detecting and understanding sequence, using context, getting the facts, drawing conclusions.
- F. Control and support strategies
 - 1. Metacognitive behaviors.
 - 2. Monitoring attention and concentration.
 - 3. Attitude.
 - 4. Asking and answering questions.